

AMENDMENTS TO THE CLAIMS

Claims 1-96 are pending. Claims 23-96 are withdrawn. Claims 97-101 are canceled. Claims 1, 9, 11, 12, 20 and 22 are amended. The following listing of claims will replace all previous listings of claims in the present application.

Claim 1 (currently amended): A method of operating a robot cleaner comprising:

(a) causing at least one wheel to move, wherein the wheel is coupled to a body including a cleaning unit;

(b) causing the body to travel on a surface along a travel path, the surface being definable by a plurality of cells;

(c) during the traveling:

(i) gathering data corresponding to each traveled cell and each non-traveled cell;

(ii) at least partially cleaning the traveled cells; and

(iii) storing the data, the stored data representing a map;

(d) determining which part of the map has a highest percentage of a non-traveled cells cell; and

(e) changing the travel path based on the determination of step (d)

using the map to calculate a travel path to the non-traveled cell;

(f) using the map to determine if the travel path is free from obstructions; and

(g) if path is obstructed, rotating the travel path by a predetermined number of degrees and repeating steps (e)-(f); and

(h) if path is not obstructed, repeating steps (b)-(g).

Claim 2 (previously presented): The method of claim 1, wherein the internal map is a subgrid map.

Claim 3 (original): The method of claim 2, wherein the subgrid map is cleaned in a serpentine clean.

Claim 4 (previously presented): The method of claim 1, wherein the map is composed of cells.

Claim 5 (original): The method of claim 4, wherein the cells are marked as obstacle, cleaned or uncleaned.

Claim 6 (previously presented): The method of claim 4, wherein the map is composed of cells and a width of a cell corresponds to portion of effective cleaning unit width of the robot cleaner.

Claim 7 (previously presented): The method of claim 1, wherein the map is composed of cells and wherein a cell can be set cleaned with a single straight line path segment of robot cleaner.

Claim 8 (previously presented): The method of claim 1, wherein the map is a room map.

Claim 9 (currently amended): The method of claim 1, wherein the map contains information about [the] a region being cleaned.

Claim 10 (previously presented): The method of claim 9, wherein information of the map is cleared after the region is cleaned.

Claim 11 (currently amended): The method of claim 9, wherein a new map is prepared for [the] a next region being cleaned.

Claim 12 (currently amended): A robot cleaner comprising:

- a body including a cleaning unit;
- at least one wheel coupled to the body;
- at least one motor operatively coupled to the at least one wheel;
- at least one processor operatively coupled to the at least one motor;
- at least one input device operatively coupled to the at least one processor;
- at least one sensor operatively coupled to the at least one processor; and
- at least one memory device storing a plurality of instructions which are executable by the at least one processor to:
 - (a) cause the at least one wheel to move thereby causing the body to travel on a surface along a travel path the surface being definable by a plurality of cells;
 - (b) during the traveling: (i) gather data corresponding to each traveled cell and each non-traveled cell; (ii) at least partially cleaning the traveled cells; and (iii) store the data the stored data representing a map;
 - (c) determining which part of the map has a highest percentage of a non-traveled cells cell; and
 - (d) changing the travel path based on the determination of step (c)

using the map to calculate a travel path to the non-traveled cell;
(e) using the map to determine if the travel path is free from obstructions; and
(f) if path is obstructed, rotating the travel path by a predetermined number of
degrees and repeating steps (d)-(e); and
(g) if path is not obstructed, repeating steps (a)-(f).

Claim 13 (previously presented): The robot cleaner of claim 12, wherein the map is a subgrid map.

Claim 14 (original): The robot cleaner of claim 13, wherein the subgrid map is cleaned in a serpentine clean.

Claim 15 (original): The robot cleaner of claim 12, wherein the map is composed of cells.

Claim 16 (original): The robot cleaner of claim 15, wherein the cells are marked as obstacle, cleaned or uncleaned.

Claim 17 (previously presented): The robot cleaner of claim 12, wherein the map is composed of cells and a width of a cell corresponds to portion of effective cleaning unit width of the robot cleaner.

Claim 18 (previously presented): The robot cleaner of claim 12, wherein the map is composed of cells and wherein a cell can be set cleaned with a single straight line path segment of robot cleaner.

Claim 19 (previously presented): The robot cleaner of claim 12, wherein the map is a room map.

Claim 20 (currently amended): The robot cleaner of claim 12, wherein the map contains information about [the] a region being cleaned.

Claim 21 (previously presented): The robot cleaner of claim 20, wherein information of the map is cleared after the region is cleaned.

Claim 22 (previously presented): The robot cleaner of claim 20, wherein a new map is prepared for [the] a next region being cleaned.

Claim 23 (withdrawn): A method of operating a robot cleaner comprising:
determining a subgrid of predetermined dimensions within a room;
cleaning in a serpentine pattern within the subgrid; and
determining another subgrid of predetermined dimensions within the room to clean in a serpentine pattern.

Claim 24 (withdrawn): The method of claim 23, wherein the serpentine pattern includes straight line path segments.

Claim 25 (withdrawn): The method of claim 24, wherein the robot cleaner rotates in place in between straight line path segments.

Claim 26 (withdrawn): The method of claim 24, wherein the straight line path segments include parallel path segments that result in cleaning overlap.

Claim 27 (withdrawn): The method of claim 24, wherein when the robot cleaner gets to an obstacle, the robot cleaner starts the next path segment.

Claim 28 (withdrawn): The method of claim 27, wherein the obstacle can result in an uncleaned region in the subgrid after a first pass and wherein the robot cleaner cleans the uncleaned region in the subgrid.

Claim 29 (withdrawn): The method of claim 28, wherein the robot cleaner does another serpentine pattern cleaning within the uncleaned region.

Claim 30 (withdrawn): The method of claim N6, wherein the robot cleaner does another serpentine pattern cleaning of the subgrid from a different orientation.

Claim 31 (withdrawn): The method of claim 23, wherein the robot uses an internal map.

Claim 32 (withdrawn): The method of claim 31, wherein the internal map is composed of cells.

Claim 33 (withdrawn): The method of claim 32, wherein the cells are marked as obstacle, cleaned or uncleaned.

Claim 34 (withdrawn): The method of claim 31, wherein an internal map is a subgrid map.

Claim 35 (withdrawn): The method of claim 34, wherein the subgrid map is used to update a room map.

Claim 36 (withdrawn): The method of claim 35, wherein the room map has a lower resolution than the subgrid map.

Claim 37 (withdrawn): The method of claim 23, wherein the robot cleaner keeps track of position.

Claim 38 (withdrawn): The method of claim 23, wherein the robot cleaner cleans subgrids until the room is cleaned.

Claim 39 (withdrawn): A robot cleaner comprising:

- a cleaning unit on the robot cleaner; and

- a processor adapted to determine a subgrid of predetermined dimensions within a room, the processor adapted to control the robot cleaner to clean with the cleaning unit in a serpentine

pattern within the subgrid, the processor adapted to determine a second subgrid of predetermined dimensions within the room to clean with the cleaning unit in a serpentine pattern.

Claim 40 (withdrawn): The robot cleaner of claim 39, wherein the serpentine pattern includes straight line path segments.

Claim 41 (withdrawn): The robot cleaner of claim 40, wherein the robot cleaner rotates in place in between straight line path segments.

Claim 42 (withdrawn): The robot cleaner of claim 40, wherein the straight line path segments include parallel path segments that result in cleaning overlap.

Claim 43 (withdrawn): The robot cleaner of claim 40, wherein when the robot cleaner gets to an obstacle, the robot cleaner starts the next path segment.

Claim 44 (withdrawn): The robot cleaner of claim 43, wherein the obstacle can result in an uncleaned region in the subgrid after a first pass and wherein the robot cleaner cleans the uncleaned region in the subgrid.

Claim 45 (withdrawn): The robot cleaner of claim 44, wherein the robot cleaner does another serpentine pattern cleaning within the uncleaned region.

Claim 46 (withdrawn): The robot cleaner of claim 44, wherein the robot cleaner does another serpentine pattern cleaning of the subgrid from a different orientation.

Claim 47 (withdrawn): The robot cleaner of claim 23, wherein the robot uses an internal map.

Claim 48 (withdrawn): The robot cleaner of claim 47, wherein the internal map is composed of cells.

Claim 49 (withdrawn): The robot cleaner of claim 48, wherein the cells are marked as obstacle, cleaned or uncleaned.

Claim 50 (withdrawn): The robot cleaner of claim 47, wherein the internal map is a subgrid map.

Claim 51 (withdrawn): The robot cleaner of claim 34, wherein the subgrid map is used to update a room map.

Claim 52 (withdrawn): The robot cleaner of claim 35, wherein the room map has a lower resolution than the subgrid map.

Claim 53 (withdrawn): The robot cleaner of claim 23, wherein the robot cleaner keeps track of position.

Claim 54 (withdrawn): The robot cleaner of claim 23, wherein the robot cleaner cleans subgrids until the room is cleaned.

Claim 55 (withdrawn): A method of operating a robot cleaner comprising:

determining a subgrid of predetermined dimensions within a room, the subgrid being a rectangular region longer and wider than the robot cleaner;
cleaning the subgrid with the robot cleaner; and
determining another subgrid of predetermined dimensions within the room to clean.

Claim 56 (withdrawn): The method of claim 55, wherein the robot cleaner cleans the subgrid in a serpentine pattern.

Claim 57 (withdrawn): The method of claim 56, wherein the serpentine pattern includes straight line path segments.

Claim 58 (withdrawn): The method of claim 57, wherein the straight line path segments include parallel path segments that result in cleaning overlap.

Claim 59 (withdrawn): The method of claim 57, wherein when the robot cleaner gets to an obstacle, the robot cleaner starts the next path segment.

Claim 60 (withdrawn): The method of claim 55, wherein the obstacle can result in an uncleaned region in the subgrid after a first pass and wherein the robot cleaner cleans the uncleaned region in the subgrid.

Claim 61 (withdrawn): The method of claim 55, wherein the robot uses an internal map.

Claim 62 (withdrawn): The method of claim 61, wherein the internal map is composed of cells.

Claim 63 (withdrawn): The method of claim 62, wherein the cells are marked as obstacle, cleaned or uncleaned.

Claim 64 (withdrawn): The method of claim 61, wherein the internal map is a subgrid map.

Claim 65 (withdrawn): The method of claim 64, wherein the subgrid map is used to update a room map.

Claim 66 (withdrawn): The method of claim 65, wherein the room map has a lower resolution than the subgrid map.

Claim 67 (withdrawn): The method of claim 55, wherein the robot cleaner keeps track of position.

Claim 68 (withdrawn): The method of claim 55, wherein the robot cleaner

cleans subgrids until the room is cleaned.

Claim 69 (withdrawn): The method of claim 55 wherein the robot cleaner cleans the region using straight line path segments.

Claim 70 (withdrawn): A robot cleaner comprising:
a cleaning unit on the robot cleaner; and
a processor adapted to determine a subgrid of predetermined dimensions within a room, the subgrid being a rectangular region longer and wider than the robot cleaner, the processor adapted to control the robot cleaner to clean the subgrid with the cleaning unit, the processor adapted to determine a second subgrid of predetermined dimensions within the room to clean with the cleaning unit.

Claim 71 (withdrawn): The robot cleaner of claim 70, wherein the robot cleaner cleans the subgrid in a serpentine pattern.

Claim 72 (withdrawn): The robot cleaner of claim 71, wherein the serpentine pattern includes straight line path segments.

Claim 73 (withdrawn): The robot cleaner of claim 72, wherein the straight line path segments include parallel path segments that result in cleaning overlap.

Claim 74 (withdrawn): The robot cleaner of claim 72, wherein when the robot cleaner gets to an obstacle, the robot cleaner starts the next path segment.

Claim 75 (withdrawn): The robot cleaner of claim 70, wherein the obstacle can result in an uncleaned region in the subgrid after a first pass and wherein the robot cleaner cleans the uncleaned region in the subgrid.

Claim 76 (withdrawn): The robot cleaner of claim 70, wherein the robot uses an internal map.

Claim 77 (withdrawn): The robot cleaner of claim 77, wherein the internal map is composed of cells.

Claim 78 (withdrawn): The robot cleaner of claim 76, wherein the cells are marked as obstacle, cleaned or uncleaned.

Claim 79 (withdrawn): The robot cleaner of claim 79, wherein the internal map is a subgrid map.

Claim 80 (withdrawn): The robot cleaner of claim 80, wherein the subgrid map is used to update a room map.

Claim 81 (withdrawn): The robot cleaner of claim 70, wherein the room map has a lower resolution than the subgrid map.

Claim 82 (withdrawn): The robot cleaner of claim 70, wherein the robot cleaner keeps track of position.

Claim 83 (withdrawn): The robot cleaner of claim 70, wherein the robot cleaner cleans subgrids until the room is cleaned.

Claim 84 (withdrawn): The robot cleaner of claim 70, wherein the robot cleaner cleans the region using straight line path segments.

Claim 85 (withdrawn): A method of operating a robot cleaner comprising:

cleaning a floor surface with a robot cleaner; and

mapping a limited region about the robot cleaner in an internal map as the robot cleaner cleans; the limited region being less than a room.

Claim 86 (withdrawn): The method of claim 85, wherein at least one of the internal maps is composed of cells.

Claim 87 (withdrawn): The method of claim 85, wherein obstacles are marked in the internal map.

Claim 88 (withdrawn): The method of claim 87, wherein the internal map is used to avoid obstacles.

Claim 89 (withdrawn): The method of claim 85, wherein the limited region is defined by a period of time for which data is stored in the internal map.

Claim 90 (withdrawn): The method of claim 85, wherein the limited region is defined by a distance from the robot cleaner is stored in the internal map.

Claim 91 (withdrawn): A robot cleaner comprising:

a cleaning unit on the robot cleaner; and

a processor controlling a robot cleaner to clean a floor surface, the processor mapping a limited region about the robot cleaner in an internal map as the robot cleaner cleans; the limited region being less than a room.

Claim 92 (withdrawn): The robot cleaner of claim 91, wherein at least one of the internal map is composed of cells.

Claim 93 (withdrawn): The robot cleaner of claim 91, wherein obstacles are marked in the internal map.

Claim 94 (withdrawn): The robot cleaner of claim 93, wherein the internal map is used to avoid obstacles.

Claim 95 (withdrawn): The robot cleaner of claim 91, wherein the limited region is defined by a period of time for which data is stored in the internal map.

Claim 96 (withdrawn): The robot cleaner of claim 91, wherein the limited region is defined by a distance from the robot cleaner is stored in the internal map.

Claims 97-101 (canceled).